The correct name to be applied to the Australian freshwater crocodile, *Crocodylus johnstoni* [Krefft 1873]

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ABSTRACT

Crocodylus johnstoni is a prevailing and stable binomial designating the Australian freshwater crocodile. A brief review traces the description circumstances and recent International Code of Zoological Nomenclature changes that resolve a long-standing argument (*C. johnsoni* or *C. johnstoni*?) by exploiting the latest edition of the Code.

Key words: Nomenclature; taxonomy; Crocodylia, crocodile; *Crocodylus johnstoni; Crocodylus johnsoni*.

Krefft (1873) published a description of a new crocodile from Australia which he named *Crocodilus johnsoni*. His paper, published in the Proceedings of the Zoological Society of London, was communicated by J.E. Gray. The type material was not collected personally by Krefft, but was "discovered by Mr. Johnson (sic) of Cardwell, Rockingham Bay, Queensland". The holotype consists of AM4629, a skeleton, and AM4627, a stuffed skin minus the head from the same specimen, and is representative of the only endemic living species of Australian crocodile.

Three months later, Krefft wrote to Gray to point out a misspelling of the collector's surname. The correction was communicated before the Royal Society and published in the Proceedings (Gray 1874). Gray wrote "Mr. Krefft, in the Society's Proceedings for 1873, p. 335, describes it under the name of *Crocodilus johnsoni*, and says it was discovered by Mr. Johnson; but in a letter to me of the 15th of May, 1873, he [Krefft] says, 'I call it *Crocodilus johnstoni*', not '*johnsoni*', and I suppose the name should be that of Mr. Johnston of Cardwell, and not Johnson, as mentioned in Mr. Krefft's paper in the Proceedings."

The spelling *C. johnstoni* was consistently used in most Australian works over the next 50 yr as reviewed by H. A. Longman, longstanding director of the Queensland Museum (Longman 1925). Moreover, Longman (1925) reiterated that "Krefft first described this crocodile specifically as *C. johnsoni*, but subsequently altered the spelling to *johnstoni*, as it was found by Mr. Johnston". In a confusing twist, Longman (1925) added a short footnote from the collector, R. A. Johnston, concerning stomach contents of crocodiles (but using the spelling *C. johnsoni*) from the Herbert River, Qld.

Despite accepted use of *johnstoni* for over 50 yr and explicit clarification on the specific epithet, Longman maintained views about the Principle of Priority that were consistent with his era and chose the *johnsoni* spelling in descriptions of the species' cranial structure (Longman 1925).

Longman's spelling is a rare departure from established use of *johnstoni* by Australian workers (see Table 1). Despite the emended spelling of *johnstoni*, limited use of the original spelling persists in North America, possibly stemming from the influence of the herpetology text of Porter (1972).

In the section on Crocodylidae of the Zoological Catalogue of Australia, Cogger et al. (1983) give a synonymy for *Crocodylus johnstoni* from the previous works (*Crocodilus johnsoni* by Krefft (1873); *Tomistoma krefftii* by Gray, in Krefft (1873); and *Crocodilus* (Philas) *johnstoni* by Gray (1874).

In reviewing the above issues, King and Burke (1989) noted that rules then applying for correcting incorrect original spellings (Article 32 in the 3rd Edition of the ICZN) precluded treating Gray's (1874)) correction of Krefft's specific name to *johnstoni* as a justified emendation. Krefft used the name *johnsoni* several times in the original description and so it did not in their view qualify as an incorrect original spelling.

Except for the addition of Articles 32.2.2, 33.2.3.1 and 33.3.1, the definitions covering correct original spellings and kinds of subsequent spellings in the 4th Edition of the Code are essentially identical to those applying in previous Editions since 1961. However Article 33.1in the 4th edition of the Code confirms that *johnstoni* is a subsequent spelling of a name, different from the original spelling (Art. 32.1), that is either an emendation (as is the present case) or an incorrect subsequent spelling, or a mandatory change. Art. 33.2.1 states that "A change in the original spelling of a name is only to be interpreted as "demonstrably intentional" when in the work itself, or in an author's (or publisher's) corrigenda, there is an explicit statement of intention, or when both the original and the changed spelling are cited and the latter is adopted in place of the former…". While there is no evidence in the original publication of a "demonstrably intentional" emendation of the original spelling (i.e., Krefft's emended spelling was an unjustified emendation), there can also be no doubt of the intent of the original author (Krefft) to quickly correct the spelling of *johnsoni* to *johnstoni*, in the published statements conveyed by him in a letter to Gray (1874).

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Table 1. Usage preferences in spelling the species name for the Australian freshwater crocodile up to 1995. The listing includes only the first year of publication and the first author if more than one paper, book, or multiple authors were involved. The authors include a broad range of taxonomists, morphologists, geneticists, ecologists, physiologists and wildlife managers.

C. johnstoni		*C. johnsoni*
[2a]Gray 1874	[1]Edwards 1983	[1, 2a]Krefft 1873
[2a]Boulenger 1889	[1]Limpus 1984	[1]Longman 1925
[1]Hann 1901	[2a]Ferguson 1985	[3]Porter 1972
[1]Ogilby 1904	[1]Smith 1985	[3]Brazaitis 1973
[1]Lucas 1909	[2]Groombridge 1987	[3]Iordansky 1973
[1]Basedow 1918	[1]Manolis 1987	[3]Coulson 1981
[3]Mook 1921	[1]Letts 1987	[3]Densmore 1981
[1]Worrell 1952	[1]Onions 1987	[3]King and Burke 1989
[2a]Bustard 1970	[1]Whitehead 1987	[3]Ross 1989
[1]Alchin 1972	[1]Burbidge 1987	[2a]Steel 1989
[1]Johnson 1973	[1]Walsh 1989	[3]Thorbjarnarson 1992
[1]Cogger 1975	[1]Willis 1990	
[1]Grigg 1976	[1]Molnar 1990	
[1]Taplin 1978	[2]Alderton 1991	
[1]Messel 1978	[1]Cooper-Preston 1992	
[2b]Buffetaut 1979	[1]Kennett 1993	
[1]Compton 1981	[1]Miller 1994	
[1]Dunn 1981	[1]Seebacher 1994	
[2b]de Buffrenil 1982	[1]Tucker 1994	
[1]Webb 1982	[1]McNamara 1994	

Nationality of biologists was assigned as the country in which research was undertaken: 1 = Australian, 2a = European (UK), 2b=European (continental), 3 = North American. The spelling by Krefft (1873) was emended to *C. johnstoni* in Gray (1874). Apart from the exception of Longman (1925), contemporary use in Australia is consistent for *johnstoni*, whereas the spelling *johnsoni* dates from the Herpetology text of Porter (1972) and has continued mainly in North America.

Article 33.2.2 states that only justified emendations are mandatory changes required under Article 32.5, with the name thus corrected retaining the authorship and date of the original spelling.

Under the provisions of the 3rd edition of the Code, as an unjustified emendation the spelling "*johnstoni*" could not therefore replace the spelling *johnsoni* despite its author's clear desire to make such a correction.

However, the present edition of the Code does allow for the spelling *johnstoni* to be treated as a justified emendation through the new Article 33.2.3.1 which states that "when an unjustified emendation is in prevailing usage and is attributed to the original author and date it is deemed to be a justified emendation."

The spelling *johnstoni* has been in prevailing use for more than a century and therefore constitutes a *prima facie* case for its conservation (ICZN 2000). Established use of the spelling *johnstoni* is well substantiated by a citation history given in Table 1 and by standard Australian taxonomic works (Cogger et al. 1983; Cogger 2000). In a relatively exhaustive search of the Australian herpetological literature, of some 44 works since 1873 that include the scientific name of the Australian Freshwater Crocodile in their titles, 3 used the spelling *johnsoni* and 41 (93%) use the spelling *johnstoni* (H. Cogger, pers. comm). As an example from Google Scholar online, entering the search term *Crocodylus johnsoni* returns a message "Did you mean *Crocodylus johnstoni*?" but not vice versa.

Thus the relevant provisions of Article 33.2.3.1 of the current ICZN are met and the valid name of the Australian Freshwater Crocodile becomes *Crocodylus johnstoni* Krefft, 1873. Under the new Code it is not unnecessary to present an application to the Commission nor have it use its plenary powers to resolve a nomenclatural issue. This review is a useful example of a long-standing argument that was resolved by the latest edition of the Code.

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APPENDIX

Freshies have been termed the thinking man's crocodile.

Photo, N. FitzSimmons.

C. johnstoni share a permanent pool as river levels drop in the dry season. This aggregation occurs annually in the Lennard River, Winjana Gorge National Park, Western Australia.

Photo, N. FitzSimmons.